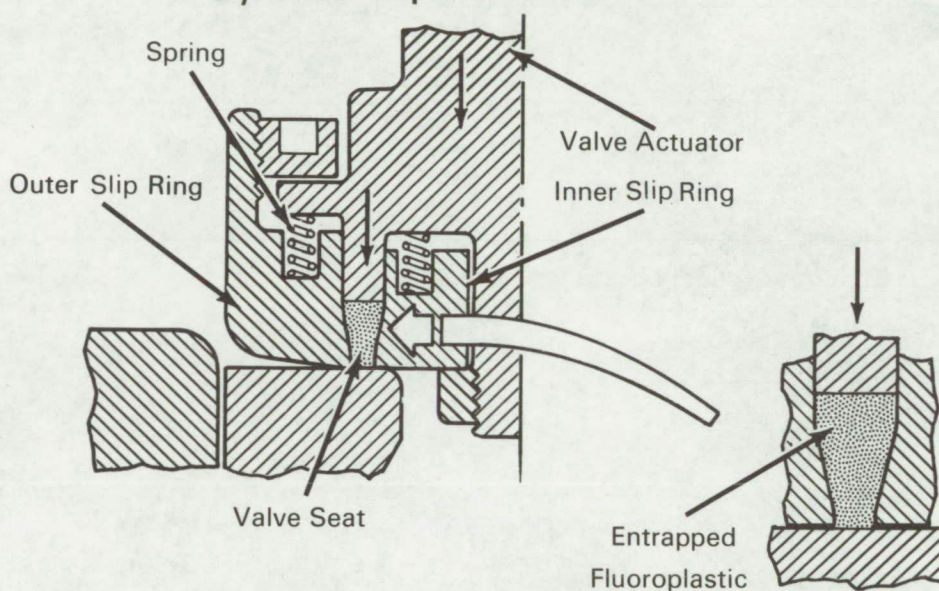


NASA TECH BRIEF



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Dynamic Captive Plastic Seal



The problem:

To provide consistent zero leakage to valves used to control fluids at operating pressures to 12,500 psi through temperatures ranging from approximately 500° to -430°F.

The solution:

A fluoroplastic material held captive between valve sealing surfaces of 16 to 125 rms microinches provides zero leakage to a high-pressure line at relatively high cryogenic temperatures, when the plastic material is subjected to sufficient stress.

How it's done:

In a typical application in a modified globe valve, a fluoroplastic sealant material is entrapped between

individually spring-loaded inner and outer slip rings, the valve sealing surface, and the valve actuator. Sealing pressure is applied by the valve actuator to the fluoroplastic in a totally confined pocket. Because the plastic material has no escape, and if the combined temperature and actuator pressure are below the embrittlement compressive strain point of the fluoroplastic, it becomes an incompressible fluid having high viscosity and surface tension.

Notes:

1. This sealing technique makes unnecessary the use of "superfinished" valve sealing surfaces since the captive fluoroplastic is forced into any surface imperfections to achieve a no leakage seal.

(continued overleaf)

2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10600

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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